UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
PATEL, JAYESH A

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*19 April 2007*</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*18-47*</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*18-47*</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>*12 September 2003*</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>*09/06-10/06*</u>.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The amendment with respect to the Election of the claims due to a restriction

requirement dated 04/19/2007 has been entered and made of record.

2. The applicant has elected Claims 18-47 without traverse.

3. Claims 1-17 has been cancelled and will not be considered for further

prosecution.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18-23 and 25-47 are rejected under 35 U.S.C. 102(b) as being

anticipated by Cuche et al (US 6262818) hereafter Cuche.

4. Regarding Claim 18 Cuche discloses a method for detecting differences

between complex images in **(Figs 1)**, comprising: acquiring a first complex image

and a second complex image, the first and second complex images including

similar features **(Elements 1,4,5, Col 11 Lines 24-57 and Col 6 Lines 26-46)**;

selecting a plurality of aberration values for the first complex image from an

anticipated aberration range at **(Col 22 Lines 30-33 and Col 23 Lines 16-22)**;

computing an aberration function for each of the selected aberration values at

(Col 16 Lines 14-50 and Col 22 Lines 36-44); iteratively modifying the first

complex image by each of the aberration functions at **(Col 23 Lines 10-65)**;

comparing the modified complex image with the second complex image; and

determining an aberration correction value by selecting the aberration value that

yields the smallest difference between the modified complex image and the

second complex image at **(Col 2 Lines 9-14,32-67 and Col 23 Lines 10-37)**.

5. Regarding Claim 19, Cuche discloses the method of claim 18, further

comprising performing a Fourier transform on the first complex image such that

the first complex image is modified in a frequency domain at **(Col 8 Lines 29-35)**.

6. Regarding Claim 20, Cuche discloses the method of claim 19, further

comprising performing an inverse Fourier transform on the modified complex

image before comparing the modified complex image with the second complex

image at **(Col 8 Lines 36-49)**.

7. Regarding Claim 21, Cuche discloses the method of claim 18, wherein

comparing the modified complex image with the second complex image

comprises determining a variance of a modulus of a ratio of the modified complex

image and the second complex image at **(Col 6 Lines 38-46 and Col 23 Lines

24-37)**.

8. Regarding Claim 22, Cuche discloses the method of claim 21, wherein

determining the aberration correction value comprises selecting the ratio having

the smallest variance between the modified complex image and the second

complex image at **(Col 21 Lines 13-38)**.

9. Regarding Claim 23, Cuche discloses the method of claim 18, wherein the first

and second complex images comprise holographic images in **(Fig 1 Elements**

4,5 and Col 6 Lines 26-46).

10. Regarding Claim 25, Cuche discloses the method of claim 18, wherein the

aberration value comprises a focus value at **(Col 23 Lines 24-32,43-48 and Col**

24 Lines 5-9).

11. Regarding Claim 26, Cuche discloses a method for detecting differences

between complex images in **(Figs 1)**, comprising: acquiring a first complex image

and a second complex image, the first and second complex images including

similar features at **(Elements1, 4,5, Col 11 Lines 24-57 and Col 6 Lines 26-46)**;

selecting a plurality of aberration values for the first complex image from an

anticipated aberration range at **(Col 22 Lines 30-33 and Col 23 Lines 16-22)**;

computing an aberration function for each of the selected aberration values at

(Col 16 Lines 14-50 and Col 22 Lines 36-44); performing a Fourier transform on

the first complex image to obtain a transformed complex image at **(Col 8 Lines**

29-35); iteratively modifying the transformed complex image by each of the

aberration functions **(Col 23 Lines 10-65)** ; performing an inverse Fourier

transform on the modified complex image to convert the low frequency ration into

a time domain **(Col 8 Lines 36-49)**; comparing high frequency components of the

transformed complex image with high frequency components of the second

complex image; and determining an aberration correction value by selecting the

aberration value that yields the smallest difference between the transformed

complex image and the second complex image at**(Col 2 Lines 9-14,32-67 and**

Col 23 Lines 10-37). At **(Col 8 Lines 46-49 and Col 9 Lines 15-25)** Cuche

discloses that the low frequencies are suppressed **(exclude)** leaving only high

frequencies to be compared.

12. Regarding claim 27, Cuche discloses the method of claim 26, wherein

comparing the transformed complex image with the second complex image

comprises determining a variance of a modulus of a ratio of the transformed

complex image and the second complex image at **(Col 6 Lines 38-46 and Col**

23 Lines 24-37).

13. Regarding Claim 28, Cuche discloses the method of claim 27, wherein

determining the aberration correction value comprises selecting the ratio having

the smallest variance between the transformed complex image and the second

complex image at **(Col 21 Lines 13-38)**.

14. Regarding Claim 29, Cuche discloses the method of claim 26, wherein the first and second complex images comprise holographic images at **(Fig 1 Elements 4,5 and Col 6 Lines 26-46)**.

15. Claim 30 is a corresponding system claim of the method performed by claim 18. See the explanation of Claim 18. Cuche also discloses the system in **(Figs 1,12a and 12b)**.

16. Claim 31 is a corresponding system claim of the method performed by claim 19. See the explanation of Claim 19. Cuche also discloses the system in **(Figs 1,12a and 12b)**.

17. Claim 32 is a corresponding system claim of the method performed by claim 20. See the explanation of Claim 20. Cuche also discloses the system in **(Figs 1,12a and 12b)**.

18. Claim 33 is a corresponding system claim of the method performed by claim 21. See the explanation of Claim 21. Cuche also discloses the system in **(Figs 1,12a and 12b)**.

19. Claim 34 is a corresponding system claim of the method performed by claim

22. See the explanation of Claim 22. Cuche also discloses the system in **(Figs**

1,12a and 12b).

20. Claim 35 is a corresponding system claim of the method performed by claim

23. See the explanation of Claim 23. Cuche also discloses the system in **(Figs**

1,12a and 12b).

21. Regarding Claim 36,Cuche discloses the system of claim 30, wherein the

digital recorder comprises a CCD camera at (Col 11Lines 40 –52).

22. Regarding Claim 37, Cuche discloses a system of claim 30, further

comprising a beam combiner optically coupled to the digital recorder, the beam

combiner operable to receive a reference beam and an object beam to generate

the first and second complex images at **(Col 6 Lines 36-37)**. Also see **(Figs**

1,2a-2d).

23. Regarding Claim 38, Cuche discloses a method for detecting differences

between complex images in **(Figs 1)**, comprising: acquiring a first complex image

and a second complex image, the first and second complex images including

similar features at **(Elements1, 4,5, Col 11 Lines 24-57 and Col 6 Lines 26-46)**;

determining if an aberration value difference exists between the first and second

complex images at **(Col 22 Lines 30-33 and Col 23 Lines 16-22) and (Col 16 Lines 14-50 and Col 22 Lines 36-44)**; correcting the aberration value difference by iteratively modifying the first complex image by an aberration function and comparing the modified first complex image with the second complex image in a high frequency range **(Col 23 Lines 10-65)**; modifying the second complex image with a low frequency ratio to replace low frequency components of the second complex image with low frequency components of the first complex image at **(Col 8 Lines 47-67,Col 9 Lines 1-15,Col 11 Lines 9-20 and Col 24 Lines 9-29)**; and comparing high frequency components of the modified first complex image and the modified second complex images to determine if the first complex image matches the second complex image at **(Col 2 Lines 9-14,32-67,Col 19 Lines 27-41 and Col 23 Lines 10-37)**. At **(Col 8 Lines 46-49 and Col 9 Lines 15-25)** Cuche discloses that the low frequencies are suppressed **(exclude)** leaving only high frequencies to be compared.

24. Regarding Claim 39, Cuche discloses the method of claim 38, further comprising: selecting a plurality of aberration values for the first complex image from an anticipated aberration range at **(Col 22 Lines 30-33 and Col 23 Lines 16-22)**; and computing the aberration function for each of the aberration values at **(Col 16 Lines 14-50 and Col 22 Lines 36-44)**.

25. Regarding Claim 40, Cuche discloses the method of claim 38, further

comprising performing a Fourier transform on the first complex image such that

the first complex image is modified in a frequency domain at **(Col 8 Lines 29-35)**.

26. Regarding Claim 41, Cuche discloses the method of claim 40, further

comprising performing an inverse Fourier transform on the modified first complex

image before comparing the modified first complex image with the second

complex image at **(Col 8 Lines 36-49)**.

27. Regarding Claim 42, Cuche discloses the method of claim 38, wherein

comparing the modified first complex image with the second complex image

comprises determining a variance of a modulus of a ratio of the modified first

complex image and the second complex image at **(Col 6 Lines 38-46 and Col

23 Lines 24-37)**.

28. Regarding Claim 43, Cuche discloses the method of claim 42, further

comprising determining an aberration correction value by selecting the ratio

having the smallest variance between the modified first complex image and the

second complex image at **(Col 21 Lines 13-38)**.

29. Regarding Claim 44, Cuche discloses the method of claim 38, further

comprising applying a low pass filter to a ratio of the modified first complex image

and the second complex image to obtain the low frequency ratio at

(Col 8 Lines 54-67 and Col 9 Lines 1-15). Cuche discloses that the Fourier

filtering image processing can be done before **(and/or)** after the numerical

reconstruction of the hologram at **(Col 8 Lines 54-67)**.

30. Regarding Claim 45, Cuche discloses the method of claim 44, further

comprising calculating a Fourier transform of the ratio of the modified first

complex image and the second complex image in order to apply the low pass

filter in a frequency domain at **(Col 8 Lines 54-67 and Col 9 Lines 1-15)**.

31. Regarding Claim 46, Cuche discloses the method of claim 45, further

comprising calculating an inverse Fourier transform of the low frequency ratio in

order to modify the second complex image in a time domain at **(Col 8 Lines 36-

49)**.

32. Regarding Claim 47, Cuche discloses the method of claim 38, wherein the

first and second complex images comprise holographic images at **(Fig 1

Elements 4,5 and Col 6 Lines 26-46)**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cuche in view of Chen (US 4850662) Hereafter Chen.

33. Regarding Claim 24, Cuche discloses all the limitations of Claim 18. Cuche also discloses correcting the aberration at **(Col 22 Lines 30-33)** and is silent about the minimum and maximum aberration values. Chen however discloses wherein the anticipated aberration range includes a minimum aberration value and a maximum aberration value at **(Col 5 Line 57-65 and Col 6 Lines 50-62)**.

Both Cuche and Chen are from the same field of endevour and are analogous art and have the same problem of correcting the aberration, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to use the teachings of Chen in correcting aberrations in the method and apparatus of Cuche for the above reasons.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayesh A. Patel whose telephone number is 571-270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax

phone number for the organization where this application or proceeding is

assigned is 571-273-8300.

Information regarding the status of an application may be obtained from

the Patent Application Information Retrieval (PAIR) system. Status information

for published applications may be obtained from either Private PAIR or Public

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free). If you would like assistance from a USPTO Customer Service

Representative or access to the automated information system, call 800-786-

9199 (IN USA OR CANADA) or 571-272-1000.

Jayesh Patel
05/03/07   JP

JINGGE WU
SUPERVISORY PATENT EXAMINER